

**ENVIRONMENTAL PROTECTION  
AGENCY****40 CFR Part 86****[AMS-FRL 1648-7]****Investigation of Averaging for Heavy-  
Duty Engine and Light-Duty Truck NO<sub>x</sub>  
Emissions****AGENCY:** Environmental Protection  
Agency.**ACTION:** Advance Notice of Proposed  
Rulemaking.

**SUMMARY:** EPA is developing a rulemaking proposal which would permit some form of emissions averaging for NO<sub>x</sub> emissions from heavy-duty engines and light-duty trucks. The effect of permitting averaging would be to increase the flexibility afforded manufacturers in attaining emission reductions, and thereby reduce the burden of compliance, without reducing air quality benefits. EPA anticipates that averaging would be applicable to the 1985 and later model years, in conjunction with the statutory NO<sub>x</sub> emission standards required under Section 202(a)(3) of the Clean Air Act as amended in 1977. Development of those standards is now being pursued in a separate rulemaking.

**DATES:**

A workshop is scheduled for January 1981, at a date, time and place to be announced in a subsequent notice. The closing date for submission of comments will also be announced at that time.

EPA anticipates publication of a Notice of Proposed Rulemaking in the spring of 1981, with final rulemaking by the end of 1981.

**ADDRESSES:**

Written comments, other than those submitted directly to EPA at the workshop, should be submitted (in duplicate if possible) to Public Docket No. A-80-49 at:

Central Docket Section (A-130)  
Environmental Protection Agency  
Attn: Docket No. A-80-49  
401 M Street, S.W.  
Washington, D.C. 20460

Materials relevant to this rulemaking will be placed in the docket by EPA. The docket is located at the above address in the West Tower Lobby, Gallery I. The docket may be inspected between 8 a.m. and 4 p.m. on weekdays. A reasonable fee may be charged for copying.

**FOR FURTHER INFORMATION CONTACT:**  
Glenn Passavant, U.S. Environmental  
Protection Agency, Emission Control  
Technology Division, 2565 Plymouth  
Road, Ann Arbor, MI 48105, Telephone:  
(313) 668-4408.

**SUPPLEMENTARY INFORMATION****Background**

The concept of averaging is not new to EPA, or to motor vehicle manufacturers. Averaging is used for determining Corporate Average Fuel Economy (CAFE) values in relation to the statutory fuel economy requirements. In addition, EPA has applied a related concept, known as the "bubble policy," to stationary sources. The reason for adopting such approaches as these is to obtain needed environmental benefits (i.e., reductions in emissions) with the minimum burden on the regulated industry. Averaging would reduce the burden on manufacturers by allowing them to maximize emission reductions where they are most easily obtained in trade for increased emissions in cases where control is more difficult or expensive.

When the recent light-duty diesel particulate regulations were promulgated, EPA indicated that it would investigate the use of averaging as part of the 1985 NO<sub>x</sub> emission regulations for heavy-duty engines or vehicles. A task force was formed and began development of potential approaches to averaging. It very quickly became evident that adoption of averaging could have substantial impact on a wide range of EPA programs, and that these impacts needed to be considered carefully if a successful program was to result. In addition, EPA felt the need for considerable industry involvement early in the development process. At this point, the Agency was faced with a dilemma. The 1985 NO<sub>x</sub> emission regulations for heavy-duty engines or vehicles and light-duty trucks (which are being handled as a single rulemaking) are restricted to a very tight timetable through deadlines established in the 1977 Clean Air Act Amendments. Since averaging is clearly not required by the Act, it would not be appropriate to substantially delay the NO<sub>x</sub> rulemaking for the purpose of including an averaging concept. Therefore, EPA has decided to treat averaging as a separate rulemaking action. However, every reasonable effort will be made to finalize the results of the averaging rulemaking and the NO<sub>x</sub> rulemaking on the same time line.

**Purpose**

The purpose of this rulemaking action will be to pursue the development of an emissions averaging concept to be applied to NO<sub>x</sub> emissions from light-duty trucks and heavy-duty engines or vehicles, for model year 1985 and beyond. Although a specific proposal has yet to be formulated, some

anticipated provisions have been identified. Averaging would be restricted to within the same vehicle class (i.e., light-duty truck or heavy-duty engine). Averaging would apply on a manufacturer-specific basis. The program would result in emission limits for individual engine families and possibly a maximum limit above which no engine family could certify. Various averaging scenarios could result in emission limits for engine families being fixed at various times throughout the model year. The averaging methodology would be formulated in order to maintain—on a vehicle class and manufacture-specific basis—the overall emission reductions of the present non-averaging approach, i.e., the standards prescribed in the Act.

The benefits to be obtained from adopting an averaging program involve reduced costs to manufacturers resulting from increased flexibility in meeting emission standards. Instead of every family being certified to the same emission standard, the manufacturers would be able to use a variety of control strategies to achieve compliance under an averaging approach. For example, manufacturers could comply with the standard by achieving increased emission reductions in the families where reductions are most readily achievable. Clearly, the degree of difficulty and cost of achieving emissions reductions will vary from family to family.

It is possible that an averaging approach would also lead to improved fuel economy. This may be especially true in the case of NO<sub>x</sub> due to the relationship between NO<sub>x</sub> control and fuel economy for some control approaches. This potential savings is further enhanced by the fact that the quick fix technology sometimes used in short leadtime situations may also cause a fuel economy penalty (e.g., retarded timing). Additionally, the higher emitting engines which would require the greatest total reductions with a per vehicle standard would require less total reduction and would thus be able to minimize any fuel economy penalty which might otherwise occur with these engines.

The use of an averaging approach would minimize the chance that any family would have to be dropped from production due to "last minute" technological difficulty in demonstrating compliance with the emission standards. The higher emissions from these families could be offset by lower emissions from other families. This would have the added advantage of allowing longer use

of non-recurring investments such as R&D and tooling for some families.

In relation to marketing, an averaging approach would allow the "market testing" of a limited number of new engines or engine lines without the relatively large fixed cost of R&D associated with demonstrating compliance with a single stringent emission standard. However, as the sales of such an engine line grew, the manufacturer would need to offset the imbalance if this engine line had an emission limit above the applicable standard for the entire class. This offset could be achieved by lowering emissions or managing sales or emission levels from this or another engine line.

An averaging approach allows manufacturers to choose where their emission-related R&D funds will be spent, and may allow the emission-related expenditures to be spread more evenly over several years rather than lumped into the few years preceding the implementation of a revised standard.

One other potential savings is related to the flexibility a manufacturer has in establishing the emission limits for each family. For example, a manufacturer may choose to establish the emission limit for a family such that when produced it conforms to the emission standards of one or more of its export markets. This would decrease both development and production costs.

#### Issues

There are a number of issues to be resolved in developing a successful averaging program.

*A. Can an averaging concept be designed consistent with the Clean Air Act?* The Clean Air Act prescribes specific reductions in NO<sub>x</sub> emissions for heavy-duty engines and light-duty trucks. Clearly, any averaging program must require adherence to the statute. At a minimum, this means that while an averaging program might allow manufacturers to set different emission limits for different engine families, a manufacturer's sales-weighted average emission level for the entire engine or vehicle class could not exceed the applicable standard for the class. In addition, the Act requires that applicable emission limits be met by all engines or vehicles to which they apply. One way of addressing this requirement might be to require that a manufacturer who wishes to use an averaging scheme establish a fixed mission limit for each of the engine families involved (as opposed to allowing averaging within such families). In any event, comments are particularly solicited on these and other legal issues that may be raised by particular averaging schemes.

*B. Can an averaging concept be successfully integrated with other EPA mobile source programs?* For example, EPA's present certification program is oriented toward compliance/non-compliance decisions which can be made on an isolated engine family basis. In an averaging program where a manufacturer was responsible only for average emission rates encompassing numerous families, the effect of an individual family's emission rates could not be determined without considering all other families from the same manufacturer and might in fact even fluctuate (with actual sales) over time. Such an environment of "moving targets" would make it very difficult to operate a meaningful certification program and at the same time avoid burdensome and complicated paperwork. In addition, certification could conceivably be a single go/no-go decision for the manufacturer's entire product line, with the threat being that no vehicles could be produced if the projected average exceeded the standard. Such jeopardy would be undesirable from the manufacturer's viewpoint.

EPA's present recall programs as well as state inspection and maintenance programs also rely on identifiable fixed emission limits. In-use data sufficient to identify a manufacturer's true corporate average emissions would have to be quite extensive, and it likely will be impractical to do this, which indicates the need for fixed limits. For state-operated I/M programs to operate without fixed limits for each vehicle tested clearly would also be unworkable. In the narrowest sense, since this rulemaking deals only with NO<sub>x</sub>, it would not likely impact on many (or any) I/M programs. However, because what is decided here may affect future programs for HC and CO emissions, it is necessary to consider the question at this time.

Impacts such as these examples just mentioned are possible throughout EPA's mobile source program. Resolution of these difficulties will constitute an important aspect of this rulemaking.

*C. Can an averaging concept be designed to maintain equity between manufacturers?* EPA believes that as much as possible, its regulation should be designed so as to impact manufacturers equally and not create advantages or disadvantages for certain manufacturers. However, depending on how averaging is applied, it could be of much greater benefit to manufacturers with broad product lines than to manufacturers engaged in more limited

or specialized production. A clear illustration of this would occur if averaging of gasoline-fueled engine emissions and diesel engine emissions were allowed. Those manufacturers who produce only diesel engines would not be in a position to benefit from such an option, while those who also produced gasoline-fueled engines would. Since it is considerably more difficult to obtain low NO<sub>x</sub> emissions from diesel than from gasoline-fueled engines, the diesel-only manufacturer would be at a substantial disadvantage. A similar situation would arise if averaging between light-duty trucks and heavy-duty engines were allowed. Both of these problems can be eliminated if averaging is restricted by engine type and vehicle type. Of course, this would also decrease the potential benefits of the averaging approach for some manufacturers.

Other areas of possible equity concerns are manufacturing diversity in engine size mix, drive trains (i.e., 2-wheel drive or 4-wheel drive), or vehicle sizes (for light-duty trucks). The more specialized manufacturers in these areas would have inherently less ability to take advantage of averaging than those manufacturers offering a wide variety of products. This could put the specialized manufacturers at a competitive disadvantage, and eventually disrupt the market. Due to the current market structure it is evident that a few large, diverse manufacturers would benefit the most from averaging, at the expense of smaller manufacturers. If this aspect of averaging is not overcome, it could be a significant disadvantage.

*D. Can averaging be implemented without adverse environmental impact?* The averaging program must be designed to avoid adverse impacts on air quality both nationwide and locally.

In terms of broad overall impact, the question is one of a shift in the average emission rates attributable to adoption of averaging. Present regulations would require vehicles or engines being produced for 1985 to meet emission standards with a 90 percent pass rate. To assure that 90 percent of the vehicles or engines meet the standards would require a manufacturer to maintain his average emission level (after incorporating the effect of the appropriate deterioration factor) somewhere below the standard. This feature could be retained for averaging, by applying a 90 percent pass rate to each engine family. The adoption of some other forms of averaging, such as pure averaging, would allow the manufacturer's average emission level (again after incorporating the

appropriate deterioration factor) to rise up to equal the standard. Such a change would, of course, have less relative environmental benefits, and is therefore undesirable.

A second area of concern is more localized and related to the mechanics of balancing high emissions from some engine families against low emissions from others. If for one reason or another a certain geographical area had a high proportion of an engine type which was a high emitter (which could not occur under a non-averaging approach) then it could suffer from degraded air quality. One possible case involves transit buses in urban areas. If diesel bus engines emitted above the standard applicable for the class, the potential for air quality degradation would exist. The concentration of high speed/low horsepower diesel engines in Class VI trucks (19,500-26,000 lb. GVW) is another example. These engines exhibit a tendency toward higher emissions, while at the same time Class VI trucks accumulate a larger than average share of their mileage in urban areas. One final example concerns the use of specialized vehicles in certain geographic areas. Cities such as Buffalo, Pittsburgh and Cleveland, which receive heavy winter snows and can also have quite hilly terrain, may have a larger than average concentration of four-wheel drive light trucks. The concentration of these vehicles in such urban areas, along with higher emissions from four-wheel versus two-wheel drive trucks, may lead to localized air quality problems.

#### Workshop and Comments

A workshop is scheduled for January 1981, at a date, time and place to be announced in a subsequent notice. At that workshop EPA will receive comments on the issues discussed in this notice and expanded upon in a background criteria paper which EPA is preparing for public dissemination concurrent with the public workshop notice. Opportunity will also be provided for the manufacturers and other interested parties to present specific averaging programs which they believe satisfy the issues and criteria explained in the background paper. The record will be open for submission of comments for 30 days following the workshop.

Comments are invited on the issues outlined above, as well as any other items commenters feel are appropriate. Comments on desirable or undesirable components of an averaging program from the commenter's viewpoint and the reasons for them would be particularly appreciated. Relevant comments

received before the end of the comment period will be considered in development of the proposed regulation. Comments should be submitted in writing to the public docket at the address given above (see "ADDRESSES").

Dated: November 18, 1980.

Douglas M. Costle,  
*Administrator.*

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